

REMARKS

By the present amendment, independent claims 3, 7, 9 and 10 have been amended to obviate the examiner's objections thereto and/or to further clarify the concepts of the present invention. More particularly, independent claims 3, 7, 9 and 10 have been amended to incorporate features of dependent claims 12, 14, 16 and 18. These claims have been canceled. Support for these amendments may be found at page 8, lines 9-15; the paragraph starting from page 11, line 19 to page 12, line 5; page 13, lines 14-18; and page 14, lines 18-25 of the specification as well as the subject matter shown in Figs. 2, 3e and 3f.

It is submitted that no new matter has been added by the amendments to these claims. Thus, claims 1-11, 13, 15 and 17 remain pending with claims 1 and 2 withdrawn from consideration. Entry of these amendments is believed to be in order and such is respectfully requested.

In the Office Action dated June 16, 2005, claims 3-4 and 7-18 were rejected under 35 USC § 103(a) as being unpatentable over the patent to Kuroi et al in view of the patents to Zhang et al and Krivokapic et al. In making this rejection, it was asserted that the cited Kuroi et al patent teaches the method as claimed except for (a) removing

insulation in the mask aligning trench and (b) depositing the oxide insulation in the trenches by performing HDPCVD. The Zhang et al patent was then asserted to teach the former and the Krivokapic et al patent was then asserted to teach the latter. It was concluded that it would be obvious to use these teachings of the Zhang et al and the Krivokapic et al patents in conjunction with that of the Kuroi et al patent. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

It is submitted that the patents to Kuroi et al, Zhang et al and Krivokapic et al, whether taken singly or in combination, do not teach or suggest the methods as presently claimed for at least two important reasons. First, the claims as amended herein define a mask alignment mark (a mask aligning step) between an upper surface of an insulation 51 deposited in a mask aligning trench 50 and an upper surface of a semiconductor substrate 1. In distinct contrast, the mask aligning mark of the Kuroi et al patent is a recess defined by a film 8 located above a mask aligning trench 10A as is shown in Figs. 14 and 15 of the patent. The mask aligning mark of the Kuroi et al patent is not defined between an upper surface of an insulation 2A deposited in the mask aligning trench 10A and an upper surface of a semiconductor substrate 1.

Furthermore, the Kuroi et al patent teaches covering the insulation 2A by the film

8 prior to aligning a mask using a mask aligning mark (the recess of the film 8). Thus, it is submitted that there would no motivation for one of ordinary skill in the art to replace the mask aligning mark of the Kuroi et al patent with a step defined between the upper surface of the insulation 2A deposited in the mask aligning trench 10A and the upper surface of the semiconductor substrate 1, because doing so would have been contrary to the teachings of the Kuroi et al patent.

Secondly, with the method as presently claimed, an upper portion of a silicon oxide insulation 41a, which is deposited in an element partitioning trench 40, projects above the upper surface of a silicon oxide film 11 by a controlled height (for example 100 nm) just before patterning a conductive film such as a gate electrode 31 on the substrate 1. In this regard, specific attention is directed to page 8, lines 9-15 and paragraph starting from page 11, line 19 to page 12, line 5 of the specification.

The subject method can produce a semiconductor device as shown in Fig. 2 of the present application in which an upper surface of an insulation 41 deposited in an element partitioning trench 40 is flush with an upper surface of a substrate 1 (element forming sections 20, 30). Since this flush surface structure is automatically formed at the time of completion of patterning the conductive film 31, an additional procedural step is not necessary to flatten the upper surface of the semiconductor device just before patterning

the conductive film.

The controlled height of the silicon oxide insulation 41a is substantially equal to the thickness of the silicon nitride film 12c. A person skilled in the art is capable of determining the thickness of the silicon nitride film 12c by conducting a preliminary test. In particular, a person skilled in the art can accurately adjust the controlled height of the insulation 41a deposited in the element partitioning trench 40 by controlling thickness of the initially formed silicon nitride film 12a (Fig. 3a), CMP conditions (Figs. 3d and 3e), and conditions for etching the silicon nitride film 12 (Figs. 3e and 3f) in accordance with the results of the preliminary test.

In distinct contrast to the above, Figs. 13 and 14 of the Kuroi et al patent show that the insulation 2B deposited in the element partitioning trench 10B is covered by layers 6, 7, and 8. Due to the presence of layers 6-8, an upper portion of the insulation 2B cannot be removed later and it therefore remains as a projection. Consequently, the insulation 2B deposited in the element partitioning trench 10B is not flush with the upper surface of the substrate 1.

It is further submitted that the patents to Zhang et al and Krivokapic et al do not supply the teaching deficiencies of the Kuroi et al patent with respect to the above features

of the invention. More specifically, neither of these patents teach or suggest that an upper portion of the silicon oxide insulation 41a has a controlled height that is equal to an etched amount of the insulation 41a during a period from when a silicon oxide film 11 is etched to when a conductive film 31 is patterned. Therefore, it is submitted that independent claims 3, 7, 9, and 10 as amended patentably distinguish over the cited patents.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 3-4 and 7-18 as amended over the cited patents are respectfully requested.

Claims 5 and 6 were rejected under 35 USC § 103(a) as being unpatentable over the above patents to Kuroi et al, Zhang et al and Krivokapic et al in view of the patent to Schoenfeld et al. The former patents were applied as in the previous rejection and the latter patent was asserted to supply the teaching deficiency of the first three patents with respect to the use of rotary grinding in a CMP process. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

The above remarks relative to the teaching deficiencies of the Kuroi et al, Zhang et al and Krivokapic et al patents are reiterated with regard to this rejection. It is submitted

that the patent to Schoenfeld et al does not supply these teaching deficiencies. Thus, it is submitted that the distinctions as developed above with respect to the initial rejection are applicable to this rejection as well. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 5 and 6 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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